

## **Management Issues In The Planning And Implementation Of Flood Forecasting And Disaster Reduction Projects In An International River Basin**

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The Mekong River, originating from the Tibetan Plateau at an elevation of 5,000 m, flows in a southerly direction through mountainous areas of Yunan province (China), and passes through Myanmar, Laos, Thailand, Cambodia and Vietnam. Flooding in the Mekong River Basin is a recurrent event affecting the entire basin. Almost every year, it takes away a lot of lives and causes damage to infrastructure, agricultural and industrial production and severely affects socio-economic development. Recurring flood of the magnitude and frequency observed in the region is a significant impediment to a more rapid development in the Mekong basin. However, flooding of the Mekong and its tributaries is also an important source for the wealth in bio-diversity, abundance of fish, and soil fertility in the Mekong River Basin.

After the catastrophic 2000 floods, followed by serious floods in the year 2001 and 2002, there have been growing concerns about the rising severity of these annual hazards and increasing threat to the livelihood of communities living along the basin. This has led to the development and approval of Mekong River Commission (MRC)'s Flood Management and Mitigation Strategy. Based on the strategy, Flood Management and Mitigation Programme (FMMP) was developed, aiming at preventing, minimizing or mitigating people's suffering and economic losses due to floods, while preserving the environmental benefits of floods.

The Flood Forecasting and River Monitoring System in the MRC have over the years been improved to provide timely and accurate river forecast to the member countries in order to reduce the vulnerability of floods and droughts. During the flood season (June-October), five-day flood forecasting and flow forecasts are conducted at 19 stations along the Mekong mainstream and updated daily at <http://www.mrcmekong.org>, while seven-day river monitoring during dry season (November-May) are updated on a weekly basis. The MRC Forecasting System consists of three main components; data collection and transmission from the member countries and other sources, forecast preparation using various forecasting tools, and forecast dissemination through the website and e-mail to the concerned line agencies. Apart from the data received from the countries, weather data/forecasts from various sources, including those from USGS/NOAA is also used. A variety of forecasting tools is applied for forecasting water levels and discharges: the Streamflow Synthesis and Reservoir Regulation (SSARR) model for the upper part of the basin, multiple regression models for the lower reach of the delta with over bank flow, an Artificial Neural Network model for both, upper and lower reaches. Forecast products in term of water level forecast bulletin are published on the MRC website and disseminated to the National Mekong Committees, concerned line agencies, National Disaster Management Committee and other interested parties by e-mail.

The FMMP addresses flood early warning as one of the top priorities. The goal of the project is to reduce the vulnerability of communities in the Lower Mekong Basin to higher-than-normal annual floods and flash flooding. This goal will be met by providing timely flood warnings to the population in flood-vulnerable communities. Concurrently, communities will be provided with adaptable and useable tools, and training that will allow them to reference their communities to

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MRC-prepared flood information for forecast points throughout the basin. The concept of the early warning system is to alert the provincial, district and village level authorities as well as communities about an exceptional flood in the Mekong River, which could result in a disaster.

The existing MRC Forecasting System was deemed adequate in the past. However, rapid population growth in the region, intensification of agriculture, climate change, changes in land use and river morphology, and rapid technology development makes it imperative that the system be upgraded, and a forecasting system, based on modern technology combined with a more effective warning system, be installed. Improvement of flood forecasting operations requires continuous efforts in many fields, including river monitoring network, data collection, transmission and processing; development of advanced forecasting techniques, communication network and assessment of forecasts. To improve the river monitoring network, data collection and transmission system, the hydro-meteorological network is in the process of being rehabilitated and upgraded to provide more timely and accurate data.